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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/704,431	11/02/2000	Qiang Cheng	YOR920000622US1	4785

7590 07/23/2004

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EXAMINER	
HARPER, V PAUL	

ART UNIT	PAPER NUMBER
2654	

DATE MAILED: 07/23/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No. 09/704,431	Applicant(s) CHENG ET AL.	
	Examiner V. Paul Harper	Art Unit 2654	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☐ Responsive to communication(s) filed on _____.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-36* is/are rejected.

7)☒ Claim(s) *36* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date *4/22/2003*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Information Disclosure Statement

1. The Examiner has considered the references listed in the Information Disclosure Statement dated 4/22/2003. A copy of the Information Disclosure Statement is attached to this office action.

Claim Objections

2. Claim 35 is objected to because of the following informalities: Two claim 35's are designated. Change "35" on line 7 of page 29 to –36--. Appropriate correction is required.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1, 2, 5, 6, 12-15, 18, 19, 22, 23, 29-32, 35 and 36 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee et al. (U.S. Patent 5,937,000), hereinafter referred to as Lee.

Regarding **claims 1, 18 and 35**, Lee discloses a method for embedding auxiliary data in a primary data signal. Lee's method includes the following:

- generating a spread spectrum signal, wherein the spread spectrum signal is representative of the digital information and further wherein the spread spectrum signal is within a frequency bandwidth corresponding to [the primary data] signal (col. 2, lines 52-67, where the shaping of the spread spectrum signal to simulate the spectral shape of the primary data signal corresponds to having the spread spectrum signal within frequency bandwidth);
- embedding the spread spectrum signal in [the primary data] signal (col. 2, lines 63-67, combining signals).

Lee also states that the primary data signal can be virtually any type of data signal (col. 20, line 24) including audio data (col. 10, lines 57-60), but Lee does not specifically state that the primary data signal is a speech signal.

Nevertheless, it would have been obvious to one of ordinary skill in the art at the time the invention was made to include speech signals in the class of data signals handled by Lee's method, since speech signals are a form of audio signal.

Regarding **claims 2 and 19**, Lee teaches everything claimed, as applied above (see claims 1 and 18). In addition, Lee teaches "the generating step comprises the step of implementing one or more selected parameters associated with the spread spectrum signal such that the spread spectrum signal is within the frequency bandwidth

corresponding to speech" (e.g. Fig. 5(a), items 88 and 94, col. 11, lines 26-33, for spectral shaping).

Regarding **claims 5 and 22**, Lee teaches everything claimed, as applied above (see claims 2 and 19). In addition, Lee teaches "the generating step further comprises the step of implementing a predetermined pseudonoise sequence length" (col. 2, lines 55-56, col. 10, lines 37-42).

Regarding **claims 6 and 23**, Lee teaches everything claimed, as applied above (see claims 2 and 23). In addition, Lee teaches "the generating step further comprises the step of implementing a predetermined carrier frequency such that the spread spectrum signal is within the frequency bandwidth corresponding to speech" (col. 2, lines 61-67).

Regarding **claims 12 and 29**, Lee teaches everything claimed, as applied above (see claims 1 and 18). In addition, Lee teaches "the step of recovering the digital information embedded in the speech signal" (Fig. 6, col. 13, lines 46-50).

Regarding **claims 13 and 30**, Lee teaches everything claimed, as applied above (see claims 12 and 29). In addition, Lee teaches the following:

- the steps of analyzing the speech signal with the embedded spread spectrum signal using linear prediction (Fig. 6, col. 13, lines 54-57),

- the speech signal analysis determining one or more parameters associated with an inverse filter (col. 13, lines 55-59);
- and filtering the speech signal with the embedded spread spectrum signal using the inverse filter (col. 13, lines 56-67).

Regarding **claims 14 and 31**, Lee teaches everything claimed, as applied above (see claims 13 and 30). In addition, Lee teaches the following:

- the recovery step comprises the steps of detecting the spread spectrum signal in the speech signal (col. 14, lines 12-18);
- demodulating the spread spectrum signal to obtain the digital information (Fig. 4, col. 14, lines 12-18, spectrum demodulator).

Regarding **claim 36**, claim 36 has limitations similar to claims 1, 12, 13, and 14 and is rejected for the same reasons.

Regarding **claims 15 and 32**, Lee teaches everything claimed, as applied above (see claims 14 and 31). In addition, Lee teaches that "the recovery step further comprises the step of synchronizing on a pseudonoise sequence used in generating the spread spectrum signal" (col. 14, lines 12-17).

4. Claims 3, 4, 20 and 21 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of well known prior art (MPEP 2144.03).

Regarding **claims 3 and 20**, Lee teaches everything claimed, as applied above (see claims 2 and 19). As stated previously, Lee teaches spectral shaping of the spread spectrum signal, but Lee does not specifically teach "the generating step further comprises the step of low pass filtering the spread spectrum signal to be within the frequency bandwidth corresponding to speech." However, the examiner takes official notice of the fact that the use of low pass filtering for the purpose of shaping a spectrum was well known in the art.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lee such that a low pass filter was used for spectral shaping, since this a very common technique for limiting bandwidth.

Regarding **claims 4 and 21**, Lee teaches everything claimed, as applied above (see claims 2 and 19). As stated previously, Lee teaches spectral shaping of the spread spectrum signal, but Lee does not specifically teach "the generating step further comprises the step of implementing a predetermined bit rate associated with the digital information such that the spread spectrum signal is within the frequency bandwidth corresponding to speech." However, the examiner takes official notice of the fact that bit rate plays a role in the bandwidth of the signal being represented.

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lee such the bit rate used was adequate for the bandwidth of the speech signal, since sampling theory determines the bit rate needed to represent a given bandwidth signal.

5. Claims 7-11, and 24-28 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Rabiner et al. ("Digital Processing of Speech Signals," Prentice-Hall, Inc, 1978), hereinafter referred to as Rabiner.

Regarding **claims 7 and 24**, Lee teaches everything claimed, as applied above (see claims 1 and 18). In addition, Lee teaches the embedding step further comprises the steps of:

- analyzing the speech signal using linear prediction (Fig. 5(a), where item 80 is the speech input and item 88 is the LPC analysis),
- the speech signal analysis determining one or more parameters associated with a [LPC] filter (col. 11, lines 26-30, derived coefficients);
- and shaping the spread spectrum signal using the [LPC] filter (col. 11, lines 26-30, spectral shaping conforms to coefficients).

Lee does not specifically state that the parameters are associated with a vocal tract filter. However, the examiner contends that this concept was well known in the art, as taught by Rabiner.

In the same field of endeavor, Rabiner teaches the digital signal processing of speech signals where LPC analysis techniques are used and the resulting filter parameters can be thought of as a being associated with a vocal tract filter (p. 396, linear predictive analysis is the predominant technique for estimating speech parameters including vocal tract area functions).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lee by specifically providing a vocal tract filter, as taught by Rabiner, since it was well-know that an LPC filter representing speech data can be thought of as a vocal tract filter.

Regarding **claims 8 and 25**, Lee in view of Rabiner teaches everything claimed, as applied above (see claims 7 and 24). In addition, Lee teaches that the "embedding step further comprises the step of setting a gain associated with the spread spectrum signal" (abstract, col. 3, lines 25-30, col. 11, lines 42-49, col. 17, lines 20-25).

Regarding **claims 9 and 26**, Lee in view of Rabiner teaches everything claimed, as applied above (see claims 8 and 27). In addition, Lee teaches that "the gain is determined by at least one of a fixed constant, a linear predictor residual energy value associated with the speech signal and a speech energy value associated with the speech signal" (col. 4, lines 45-51, to determine a level below the interference threshold necessarily requires an energy determination).

Regarding **claims 10 and 27**, Lee in view of Rabiner teaches everything claimed, as applied above (see claim 8, and 25). In addition, Lee teaches that "the gain is determined by a linear combination of a fixed constant, a linear predictor residual energy value associated with the speech signal and a speech energy value associated with the speech signal" (col. 4, lines 45-51, to determine a level below the interference threshold necessarily requires an energy determination of the speech signal and to determine a level below an audible threshold would require a fixed adjustment).

Regarding **claims 11 and 28**, Lee in view of Rabiner teaches everything claimed, as applied above (see claims 8 and 25). In addition, Lee teaches that "the embedding step further comprises the step of adding the spread spectrum signal to the speech signal" (col. 17, lines 23-25, the resultant colored noise signal is combined with the primary data signal).

6. Claims 16 and 33 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Vigoda (U.S. Patent 6,724,805), hereinafter referred to as Vigoda.

Regarding **claims 16 and 33**, Lee does not specifically teach that "the synchronizing step is performed in accordance with a phase locked loop." However, the examiner contends that this concept was well known in the art, as taught by Vigoda.

In the same field of endeavor, Vigoda discloses a system for spread spectrum code generation and acquisition where synchronization with the pseudorandom noise sequence can be achieved using a phase locked loop (col. 6, lines 22-36).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lee by specifically providing the technique, as taught by Vigoda, since Vigoda teaches that the approach is very robust (col. 6, line 54-57).

7. Claims 17 and 34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Lee in view of Cox et al. ("Secure Spread Spectrum Watermarking for Image, Audio and Video," IEEE-ICIP 19996), hereinafter referred to as Cox.

Regarding **claims 17 and 34**, Lee teaches everything claimed, as applied above (see claims 1 and 18), but Lee does not specifically teach "the digital information is a watermark." However, the examiner contends that this concept was well known in the art, as taught by Cox.

In the same field of endeavor, Cox teaches a method for secure spread spectrum *watermarking* for images, audio and video (title, ABSTRACT, INTRODUCTION).

Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify Lee by specifically implementing the digital information as a watermark, as taught by Cox, since there is a need for copyright enforcement schemes (Cox, ABSTRACT).

Citation of Pertinent Art

8. The following prior art made of record but not relied upon is considered pertinent to the applicant's disclosure:

- Tewfik et al. (U.S. Patent 6,061,793) teach a method for imbedding data, including watermarks, where the data is spread against the frequency spectrum by a pseudo-noise code.

Conclusion

Any response to this office action should be mailed to:

Commissioner of Patents and Trademarks
P.O. Box 1450
Alexandria, VA 22313-1450

or faxed to:

(703) 872-9314

Hand-delivered responses should be brought to:

Crystal Park II
2121 Crystal Drive
Arlington, VA.
Sixth Floor (Receptionist)

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Dr. V. Paul Harper whose telephone number is (703) 305-4197. The examiner can normally be reached on Monday through Friday from 8:00 a.m. to 4:30 p.m.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Richemond Dorvil, can be reached on (703) 305-9645. The fax phone number for the Technology Center 2600 is (703) 872-9314.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the Technology Center 2600 Customer Service office whose telephone number is (703) 306-0377.

V. Paul Harper

VPH/vph
July 16, 2004

RICHEMOND DORVIL
SUPERVISORY PATENT EXAMINER